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this may be due to the fact that they have become parthenogenetic. The conjugation observed in *Saccharomycodes Ludwigii* by GUILLIERMOND, where the endospores conjugate before germination, may be only a secondary development introduced into parthenogenetic forms as a means of recuperation. "The existence of the conjugation preceding sporulation, coupled with the cytological character of the sporange, demonstrate in an evident manner the ascogenous nature of this organ, and one ought to consider with HANSEN that the *Saccharomyces* constitute an autonomous group belonging to the Ascomycetes and near to the Exoascaceae."—B. F. LUTMAN.

**Heredity in micro-organisms.**—Working with the yeast *Saccharomyces anomalus* and the bacteria *B. coli-communis*, *B. typhosus*, and *B. megatherium*, BARBER<sup>12</sup> has extended the investigations of HANSON, BEIJERINCK, CONN, MAYER, and others on such variation as may arise spontaneously from cells which vary independently of environment. The cells chosen were those showing a morphological difference from the parent, and the new races of descendants were tested further for biochemical differences. The problem of isolation was thus a much more difficult one than that of selection of bacterial "sports" in mass with physiological differences, such as that of a white colony among red pigmented ones. BARBER devised and describes an ingenious method for isolating single varying cells from a hanging drop under the microscope by means of a capillary tube, with apparatus for holding and adjusting it under the lens. A single cell drawn into this could be discharged into another hanging drop, placed in a sealed moist chamber, and its development and descendants watched for as many generations as necessary. With the yeast BARBER obtained in this way new races whose morphological characters (large, long cells) persisted over three years, such a new race successfully competing with the parent stock when mixed with it in culture. Attempts to further modify the race by selection failed. Much the same results were obtained with the bacteria. These varieties were true mutations, appearing suddenly with full-fledged characters, apparently independent of natural selection and comparable with sports among multicellular organisms. If physiological characters are correlated with morphological, as in the case of increased power of fermentation of one of BARBER's races of *B. coli*, it seems probable that mutation may be a factor in the origin of increased virulence of some pathogenic bacteria.—MARY HEFFERAN.

**Position of the nucleus.**—KÜSTER<sup>13</sup> has made a rather extensive series of observations upon the relation between the position of the nucleus and cell growth and the formation of membranes. His conclusions differ from those of HABERLANDT, especially in reference to the position of the nucleus in root hairs and stomatal apparatus, and in cells undergoing local thickenings of the cell wall.

<sup>12</sup> BARBER, MARSHALL A., On heredity in certain micro-organisms. Kansas Univ. Sci. Bull. 4:3-48. pls. 1-4. 1907.

<sup>13</sup> KÜSTER, ERNST, Ueber die Beziehungen der Lage der Zellkernes zu Zellwachstum und Membranbildung. Flora 97:1-23. 1907.